

WHAT IS CLAIMED IS:

1. A method of removing a mandrel from a part, comprising:
creating a vacuum in the mandrel;
applying a debonding agent on the surface of the mandrel; and
removing the mandrel from the part.
2. The method of claim 1, further comprising cutting an access passage in the part before creating a vacuum in the mandrel.
3. The method of claim 2, wherein cutting an access passage further comprises cutting an access passage to allow for the straightest path to remove the mandrel from the part.
4. The method of claim 1, further comprising removing media from the mandrel.
5. The method of claim 1, further comprising releasing the vacuum in the mandrel prior to applying the debonding agent.
6. The method of claim 1, wherein creating a vacuum further comprises alternately creating a vacuum in the mandrel and releasing the vacuum in the mandrel.
7. The method of claim 6, wherein the vacuum is alternately created and released two times.
8. The method of claim 6, wherein the vacuum is alternately created and released at least three times.
9. The method of claim 6, wherein the vacuum is created for five to ten seconds.
10. The method of claim 1, wherein applying the debonding agent comprises applying isopropyl alcohol on the surface of the mandrel.
11. The method of claim 1, further comprising allowing the debonding agent to stand on the mandrel for a designated period of time.
12. The method of claim 11, wherein the designated period of time is three to five minutes.
13. The method of claim 1, wherein the mandrel is a frame mandrel.
14. The method of claim 1, wherein the part is a fuselage.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

15. A system for removing a mandrel from a part, comprising:
 - a creating component configured to create a vacuum in the mandrel;
 - an applying component configured to apply a debonding agent on the surface of the mandrel; and
 - a removing component configured to remove the mandrel from the part.
16. The system of claim 15, further comprising a cutting component configured to cut an access passage in the part before creating a vacuum in the mandrel.
17. The system of claim 16, wherein the cutting component is configured to cut an access passage allowing for the straightest path to remove the mandrel from the part.
18. The system of claim 15, further comprising a second removing component configured to remove media from the mandrel.
19. The system of claim 15, further comprising a releasing component configured to release the vacuum in the mandrel prior to applying the debonding agent.
20. The system of claim 15, wherein the creating component is configured to alternately create a vacuum in the mandrel and release the vacuum in the mandrel.
21. The system of claim 20, wherein the creating component is configured to alternately create and release the vacuum two times.
22. The system of claim 20, wherein the creating component is configured to alternately create and release the vacuum at least three times.
23. The system of claim 20, wherein the creating component is configured to create the vacuum for five to ten seconds.
24. The system of claim 15, wherein the applying component is configured to apply isopropyl alcohol on the surface of the mandrel.
25. The system of claim 15, further comprising a standing component configured to allow the debonding agent to stand on the mandrel for a designated period of time.
26. The system of claim 25, wherein the designated period of time is three to five minutes.

27. The system of claim 15, wherein the mandrel is a frame mandrel.
28. The system of claim 15, wherein the part is a fuselage.
29. A computer-implemented method of removing a mandrel from a part, comprising:
- creating a vacuum in the mandrel;
 - applying a debonding agent on the surface of the mandrel; and
 - removing the mandrel from the part.
30. A system for removing a mandrel from a part, comprising:
- creating means for creating a vacuum in the mandrel;
 - applying means for applying a debonding agent on the surface of the mandrel; and
 - removing means for removing the mandrel from the part.
31. A method of removing a mandrel from a part, comprising:
- cutting an access passage in the part;
 - alternately creating a vacuum in the mandrel and releasing the vacuum in the mandrel;
 - applying a debonding agent on the surface of the mandrel;
 - allowing the debonding agent to stand on the mandrel for a designated period of time; and
 - removing the mandrel from the part.
32. The method of claim 31, wherein cutting an access passage further comprises cutting an access passage to allow for the straightest path to remove the mandrel from the part.
33. The method of claim 31, further comprising removing media from the mandrel.
34. The method of claim 31, wherein the vacuum is alternately created and released two times.
35. The method of claim 31, wherein the vacuum is alternately created and released at least three times.

36. The method of claim 31, wherein the vacuum is created for five to ten seconds.

37. The method of claim 31, wherein applying the debonding agent comprises applying isopropyl alcohol on the surface of the mandrel.

38. The method of claim 31, wherein the designated period of time is three to five minutes.

39. The method of claim 31, wherein the mandrel is a frame mandrel.

40. The method of claim 31, wherein the part is a fuselage.

41. A system for removing a mandrel from a part, comprising:

a cutting component configured to cut an access passage in the part;

a creating component configured to alternately create a vacuum in the mandrel and release the vacuum in the mandrel;

an applying component configured to apply a debonding agent on the surface of the mandrel;

a standing component configured to allow the debonding agent to stand on the mandrel for a designated period of time; and

a removing component configured to remove the mandrel from the part.

42. The system of claim 41, wherein the component is configured to cut an access passage to allow for the straightest path to remove the mandrel from the part.

43. The system of claim 41, further comprising a second removing component configured to remove media from the mandrel.

44. The system of claim 41, wherein the creating component is configured to alternately create and release the vacuum two times.

45. The system of claim 41, wherein the creating component is configured to alternately create and release the vacuum at least three times.

46. The system of claim 41, wherein the creating component is configured to create the vacuum for five to ten seconds.

47. The system of claim 41, wherein the applying component is configured to apply isopropyl alcohol on the surface of the mandrel.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

48. The system of claim 41, wherein the designated period of time is three to five minutes.

49. The system of claim 41, wherein the mandrel is a frame mandrel.

50. The system of claim 41, wherein the part is a fuselage.

51. A computer-implemented method of removing a mandrel from a part, comprising:

cutting an access passage in the part;

alternately creating a vacuum in the mandrel and releasing the vacuum in the mandrel;

applying a debonding agent on the surface of the mandrel;

allowing the debonding agent to stand on the mandrel for a designated period of time; and

removing the mandrel from the part.

52. A system for removing a mandrel from a part, comprising:

cutting means for cutting an access passage in the part;

creating means for alternately creating a vacuum in the mandrel and releasing the vacuum in the mandrel;

applying means for applying a debonding agent on the surface of the mandrel;

standing means for allowing the debonding agent to stand on the mandrel for a designated period of time; and

removing means for removing the mandrel from the part.

53. A method of removing a frame mandrel from a fuselage, comprising:

cutting an access passage in the fuselage to allow for the straightest path to remove the frame mandrel from the part;

alternately creating a vacuum in the frame mandrel for five to ten seconds and releasing the vacuum in the frame mandrel at least two times;

applying isopropyl alcohol on the surface of the frame mandrel;

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

allowing the isopropyl alcohol to stand on the frame mandrel for three to five minutes; and

removing the frame mandrel from the fuselage.

54. A system for removing a frame mandrel from a fuselage, comprising:

a cutting component configured to cut an access passage in the fuselage to allow for the straightest path to remove the frame mandrel from the part;

a creating component configured to alternately create a vacuum in the frame mandrel for five to ten seconds and release the vacuum in the frame mandrel at least two times;

an applying component configured to apply isopropyl alcohol on the surface of the frame mandrel;

an allowing component configured to allow the isopropyl alcohol to stand on the frame mandrel for three to five minutes; and

a removing component configured to remove the frame mandrel from the fuselage.

55. A computer-implemented method of removing a frame mandrel from a fuselage, comprising:

cutting an access passage in the fuselage to allow for the straightest path to remove the frame mandrel from the part;

alternately creating a vacuum in the frame mandrel for five to ten seconds and releasing the vacuum in the frame mandrel at least two times;

applying isopropyl alcohol on the surface of the frame mandrel;

allowing the isopropyl alcohol to stand on the frame mandrel for three to five minutes; and

removing the frame mandrel from the fuselage.

56. A system for removing a frame mandrel from a fuselage, comprising:

cutting means for cutting an access passage in the fuselage to allow for the straightest path to remove the frame mandrel from the part;

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

creating means for alternately creating a vacuum in the frame mandrel for five to ten seconds and releasing the vacuum in the frame mandrel at least two times;

applying means for applying isopropyl alcohol on the surface of the frame mandrel;

standing means for allowing the isopropyl alcohol to stand on the frame mandrel for three to five minutes; and

removing means for removing the frame mandrel from the fuselage.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com